



## VEGETATION MANAGEMENT GUIDELINE

Smooth Brome (*Bromus inermis* Leyss.)

### SPECIES CHARACTER

#### DESCRIPTION

Smooth brome is a deep-rooted, rhizomatous, perennial grass with stems from 1.3-4.0 feet (0.4 to 1.2 m) tall. The flat, smooth leaf blades range from 0.2-0.6 inches (5 to 15 mm) wide and 4-12 inches (1 to 3 dm) long. The flowering stem has an open panicle with stiff, ascending branches that aid in distinguishing this brome grass from native brome grasses. The panicle is 4-10.8 inches (10-27 cm) long with whorled branches and 4 to 10 flowered spikelets each 0.8-1.0 inches (2 to 2.5 cm) long. The lemmas (small scales at the base of a floret) on the spikelets typically lack an awn (a narrow bristle usually found on the end of a lemma), although a few plants with awns up to 0.08 inches (2 mm) have been observed. The spikelets become purplish or bronze-colored at maturity.

Grasses, in general, are fairly difficult to identify, and smooth brome should be accurately identified before attempting any control measures. If identification of the species is in doubt, the plant's identity should be confirmed by a knowledgeable individual and/or by consulting appropriate books.

#### DISTRIBUTION

This Eurasian grass was apparently introduced into the United States by the California Experiment Station in 1884. It is now established in most of the United States where it has been widely planted for forage and soil protection, especially along some roadsides. It is found throughout Illinois.

#### HABITAT

Smooth brome inhabits sunny locations such as roadsides, pastures, fields and banks of drainage ditches. It exhibits better root growth in sandy soils when compared to silty soils, and it typically does not become established on rich, organic soils. Smooth brome can tolerate approximately 24 days of spring flooding.

#### LIFE HISTORY

Smooth brome is a cool-season grass, beginning growth early in spring and continuing late into autumn. In Illinois, blooming usually occurs in late May to June. Plants commonly flower in synchrony and pollination can occur between plants up to 55 yards (50 m) apart. Smooth brome is an open-pollinated, self-incompatible grass.

Seed production can vary greatly, with reported rates of 47 to 160 seed heads per plant and 156 to 10,080 viable seeds per plant. Invertebrates such as Itonidid midges and Chalcid flies are predators on maturing seeds. It has been suggested that seed may be transported and hoarded by ants, creating new brome patches on anthills.

Smooth brome is a rhizomatous, sod-forming grass. The first adventitious roots may develop within 5 days after seed germination. Rhizomes begin forming from 3 weeks to 6 months after germination. The root system can reach 4.7 feet (1.4 m) in depth and may explain smooth brome's drought resistance. Lamba et. al. (1949) and Newell (1951) found that most of the root mass is concentrated in the upper soil profile. Old brome fields may exhibit a "sod bound" condition in which shoot density is lowered



and nitrogen deficiency symptoms appear.

### EFFECTS UPON NATURAL AREAS

Smooth brome invades open natural communities, such as prairies and savannas. It appears to prefer mesic and dry-mesic situations. Smooth brome will increase more under low soil moisture conditions than during high moisture conditions. It will even outcompete native grasses under drought conditions when warm season grasses theoretically have a competitive edge. Smooth brome rarely occurs in open, wet natural areas such as sedge meadows and wet prairies. This highly persistent grass forms a dense sod that can exclude other species and lower biodiversity of native plants. It spreads to and within natural areas both by seed and vegetative means.

## CONTROL RECOMMENDATIONS

### RECOMMENDED PRACTICES IN NATURAL COMMUNITIES OF HIGH QUALITY

#### *Initial effort in areas of heavy infestation*

A prescribed burn of smooth brome in the late spring, during tiller elongation (i.e. observation of above ground node or five green leaves per tiller), will reduce tiller density and biomass during the current year and the following year in tallgrass prairies. In addition to the physiological stress to smooth brome from fire, competition from increased productivity of native warm-season grasses further impairs its growth. Typically, several late spring burns (>5) are necessary to achieve adequate control. However, care must be taken not to adversely impact nesting grassland bird populations. In a 245 ha mixed prairie in central Nebraska, Nagel et al (1994) documented an increase in smooth brome when it was not burned annually over a 17 year period.

Before commencing any prescribed burns, open burning permits must be obtained from the Illinois Environmental Protection Agency and often appropriate local agencies too. Burns should be administered by persons trained or experienced in conducting prescribed burns, and proper safety precautions should be followed.

Annual spring burning **is not advisable** on prairies with a large component of native cool-season grasses (i.e., *Stipa sp.*, *Koeleria spp.*) and sedges. Burning at this time will harm the native cool-season species as well as smooth brome. In native fescue prairies in Saskatoon, Saskatchewan, Canada, a single fall or spring prescribed burn had no effect on smooth brome but suppressed the native fescue.

#### *Effort in areas of light infestation*

Same as given above for areas of heavy infestation.

#### *Maintenance control*

A regular spring prescribed burning regime should maintain control for small populations. If this is not feasible, seedlings and young plants that invade should be eliminated by hand digging. In addition, smooth brome grass plants should be eliminated from bordering areas, where possible, to prevent it from re-invading the natural area.

### RECOMMENDED PRACTICES ON BUFFER AND SEVERELY DISTURBED SITES

#### *Initial effort in areas of heavy infestation*

Prescribed burning in the spring after smooth brome has become green is recommended annually for at least five years, if time to achieve control is not a limiting factor. When more immediate results are desired, the site should be burned in late spring as described above and then sprayed with label rates of glyphosate the following autumn (approximately November 1st -

15th) after any native plants present are dormant. Typically it is necessary to burn and spray in multiple years.

Burning smooth brome stands in August has also proven effective in greatly reducing the vigor of the stand. The hot, dry conditions typically present after an August burn impair resprouting of smooth brome more than usually occurs after a spring burn when soil moisture is generally greater.

Mowing smooth brome when it is in the boot stage, followed by 3 subsequent mowings during the growing season is reportedly an effective control measure, although no Illinois natural area managers were found that have experience with this technique. The boot stage occurs when flowering heads are still enclosed within the sheath and stems are 18-24 inches tall (45-60 cm).

When burning or mowing is not feasible, use of herbicides may be necessary. Atrazine applied at 2.2kg/ha will significantly decrease smooth brome tillers, but it has also been found to negatively affect native warm season grasses and forbs. For this reason should Atrazine should not be used in natural areas. Also, great caution should be exercised in applying to buffer sites.

Illinois state foresters have had success controlling smooth brome around tree plantings using Fusilade at label rates.

Poast is a grass specific herbicide that may be effective in controlling smooth brome grass when applied according to label instructions during the spring while most native warm-season grasses are still dormant. Although no Illinois natural area managers were found that had experience with this herbicide, proper use of Poast may result in less damage to non-target vegetation than other herbicides because Poast kills only grasses (and not forbs), and reportedly does not affect sedges irises or other monocots.

As an alternate to Poast, a 2% solution of Roundup sprayed on the green foliage of smooth brome is an effective control. Care should be used while spraying to avoid contacting nontarget plants with the spray, because Roundup is a nonselective herbicide and will affect all green vegetation it contacts. **Do not spray so heavily that herbicide drips off the target species.** When using a hand-held or backpack sprayer, Roundup should be applied while backing away from the treated area to avoid walking through the wet herbicide.

By law, herbicides may only be applied as per label directions and by licensed herbicide applicators or operators when working on public properties.

Tillage may be useful in severely disturbed buffer areas that lack a native plant component, and repeated tillage is necessary in dense stands of smooth brome.

#### *Effort in areas of light infestation*

Late spring prescribed burning helps eliminate young plants and is a preferred treatment. A few isolated clumps may be dug up by hand. Spot applications of 2% Roundup in early spring or late fall are effective.

#### *Maintenance control*

Same control practices recommended as for high quality natural communities.

### **FAILED OR INEFFECTIVE PRACTICES**

Prescribed burning when smooth brome is dormant or at tiller emergence has no effect on density or biomass compared to unburned units. Mowing prior to the flowering stage similarly has no significant impact in tiller density. Digging up clumps is slow, difficult to remove all rhizomes and sometimes undesirable in a high-quality natural area. Most herbicides are ineffective if applied during dormancy or immediately after mowing. No biological controls are known that are feasible in natural areas.

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